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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,948	11/21/2006	Raffaella Costa	05788.0385	3049

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EXAMINER
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RADKOWSKI, PETER

ART UNIT	PAPER NUMBER
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2883

MAIL DATE	DELIVERY MODE
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04/02/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/566,948	<b>Applicant(s)</b> COSTA ET AL.	
	<b>Examiner</b> PETER RADKOWSKI	<b>Art Unit</b> 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on 2/3/2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) 1-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/3/2006</u> .                                                | 6) <input type="checkbox"/> Other: _____                          |

### **Detailed Office Action**

1. Claims 1 – 21 cancelled by applicants.

### **Claim Rejections - 35 USC § 103**

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

### **Claims 22-53**

3. **Claims 22-53 are rejected under 35 U.S.C. 103(a)** as being obvious over Kapon et al. (5,078,516) in view of Bartman et al. (2002/0037025) and further in view of Baak (Non-Patent Literature: "Silicon oxynitride; a material for GRIN optics").

From hereinafter, Kapon will stand in for Kapon et al. and Bartman will stand-in for Bartman et al.

**Regarding Claims 22-53**, Kapon teaches an integrated optical waveguide structure [16], and method of making an integrated waveguide structure, the integrated optical waveguide structure comprising a lower cladding layer [12] and a waveguide core; the waveguide core comprising a layer [14] and a protruding rib structure with regions with two different widths, a first region [20] interfacing with optical circuit and a second region [18] with width smaller than the width of the first region; the second region terminating in a facet; and a third tapered rib region [22] connecting and transitioning the first and second regions. (See Kapon, fig. 1)

**Further regarding Claims 22-53**, Kapon does not explicitly teach an integrated optical waveguide structure, and method of making the integrated waveguide structure, comprising the core and the layer having the same refractive index; the refractive index of the core and the layer being greater than the refractive index of cladding above and below the core; and the length and width dimensions of the core sections determined with consideration of the modal characteristics to be transported within the waveguide and with consideration the indices of refraction of the waveguide core and the cladding. However, Bartman teaches an integrated optical waveguide structure disposed on the silicon substrate [540] of an optical gain chip comprising: upper cladding [500] and lower cladding [520] comprising silicon-oxide; and light transporting core [510] and [530] comprising silicon-oxinitride; the dimensions of core and cladding determined by the requirements for coupling the light of a first field emitted by an optical gain chip with a second field external to the integrated optical waveguide structure; and by the method of

depositing the light guiding structure (See Bartman, fig. 5 and par. [0049]) Since Kapon and Bartman both teach integrated waveguide structures, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kapon to have the waveguide materials and dimensions, and method of selecting and tailoring materials and dimension, taught by Bartman because the resultant configuration would tailor waveguide modes to efficiently couple the modes of light emitted by and/or received by disparate first and second fields such that loss due to interfiled-mode-mismatch would be predictably reduced. (See Bartman, Abstract) One would have been motivated to make this modification because the ability to controllably reduce coupling losses will enhance the performance and efficiency of optical circuits comprising semiconductor optical devices.

**Further regarding Claims 22-53,** Kapon in view of Bartman does not explicitly teach an integrated optical waveguide structure, and method of making the integrated waveguide structure, comprising cladding and core regions with indexes of refraction of 1 to 40%, 1 to 20%, or 5 to 7%. However, Baak teaches heterogeneous optical materials, and methods of making smooth-gradient and/or stepped gradient heterogeneous optical materials, comprising distinct silicon oxide and silicon oxinitride regions, wherein the index of refraction of the distinct regions of the heterogeneous configuration can range from 1.45 to 2. (See Baak, Section II. Optical Properties, par. 1; and Section V. Preparation Techniques, par. 3) Since Kapon, Bartman and Baak all teach optical materials, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kapon in view of Bartman to have the optical materials, and methods of making optical materials taught by Baak because the resultant material and

structural configuration would be systematically tailored to produce a wide range of desirable optical properties. (See Baak, Section I. Introduction) One would have been motivated to make this modification because the ability to tailor indices of refractions as either continuous or stepped grading configurations facilitates the processes of designing and fabricating integrated optical waveguide structures. **Further regarding Claims 22-53**, the refractive index contrasts of 1 to 40%, 1 to 20%, and 5 to 7% fall within the range of refractive index contrasts, and method of making heterogeneous material configurations, taught by Baak. Consequently, the refractive index contrasts of 1 to 40%, 1 to 20%, and 5 to 7% fell within the prior art's range, at the time of the invention; and it would have been obvious to one of ordinary skill in the art to select a value of refractive index contrasts of 1 to 40%, 1 to 20%, or 5 to 7%. See e.g., *In re Aller*, 105 USPQ 233 (determining the optimum or workable ranges involves only routine skill in the art). One would have been motivated to select these ranges because they lend themselves to optical coupling devices characterized by low loss and facile fabrication.

### **Conclusion**

4. The prior art made of record in Form 892 and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Radkowski whose telephone number is (571) 270-1613. The examiner can normally be reached on Monday - Thursday, 8 AM to 5 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font, can

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be reached on (517) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, See <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call (800) 786-9199 (IN USA OR CANADA) or (571) 272-1000.

/Peter P. Radkowski/

3/29/2008 /James P. Hughes/

Examiner, Art Unit 2883